

Remarks

Favorable reconsideration is respectfully requested of the rejection of claims 1-9, 11 and 16-20 as being obvious over U.S. patent 4,822,524 to Strickland in view of U.S. patent 5,882,541 to Achtmann, in further view of U.S. patent 4,839,065 to Vandersall or EP 0 911 067. As noted previously and implicitly recognized in the rejection, the Strickland patent fails to teach or suggest the inclusion of at least one biopolymer having a weight average particle diameter of less than about 100 microns, as required by all pending claims. According to the Office Action, the Achtmann patent has been cited to provide a teaching that a biopolymer –xanthan gum— of a size under 100 microns is used in fire retardant compositions. Further, according to the Office Action, it would be obvious to employ a biopolymer of such small particle size in the Strickland composition “since the smaller the particle size the higher is the viscosity.” To support the contention that viscosity increases with increased particle size, the Action cites two further references (the Frolich et al. patent and the Kuwabawa et al. patent) in addition to the four cited in the statement of the rejection. The Examiner also offers to submit an affidavit to support the contention that small particle size increases viscosity.

However, as explained previously, the Achtmann patent is directed to the use of xanthan gum of particle size in the range of 50 to 250 mesh, which according to the Office Action corresponds to 60-300 microns, in a *fire extinguishing foam*. Therefore, the Achtmann patent suffers from at least two deficiencies.

First, a teaching of particles being in the range of 60 to 300 microns does not establish or even suggest that ANY particles of diameter under 100 microns were used, let alone that their *weight average particle diameter* is under 100 microns as required by the claims. Thus, the Achtmann patent does not teach any significance of maintaining the particle size under 100 microns. That the particles MAY be less than 100 microns is not a teaching or suggestion that they BE under 100 microns.

Second, although the subject Office Action states that “[a]ny reference showing any firefighting composition is relevant” because “Applicant’s claims do not exclude foams”, the point remains that the other cited references with which the subject rejection requires the

Achtmann patent to be combined are directed to wild fire suppressants. Foam fire extinguishers, to which the Achtmann patent is directed, differ dramatically in mode of application and the mechanism by which they function from the compositions of the Strickland and Vandersall patents and EP 0 911 067. Teachings with respect to such foam fire extinguishers as are addressed by Achtmann are not applicable to the type of fire retardant disclosed in the other cited patents or the subject claims.

As noted previously, the subject matter of the Achtmann patent is a biodegradable foam concentrate for use in extinguishing and controlling fire in Class B fuels (liquid hydrocarbons). Such foam concentrates are clear liquids containing surfactants, a film forming water-soluble polymer and a number of solvents (including water). The solvents are used primarily to obtain a clear concentrated liquid with a viscosity low enough so that it flows, is miscible with water and can be pumped. These products, usually referred to as AFFF (aqueous film forming foam) or AR-AFFF (alcohol resistant-AFFF), generally contain at least one non-biodegradable fluorinated surfactant. Fluorinated surfactants are under environmental scrutiny since the discovery that their fluorinated surfactants are absorbed through the skin and are bio-accumulative. Thus, the Achtmann patent represents efforts of Class B fire-fighting foam manufacturers to develop effective and biodegradable Class B foams.

In use, Class B foam concentrates are diluted with water to prepare a solution containing 3 to 6% of the concentrate. The fluorinated surfactant mixture generally used in these products is capable of reducing the surface tension of water from about 78 to 15-18 dynes/cm². When applied from an aerating nozzle, this results in the formation of a thick layer of bubbles on the surface of a hydrocarbon. This low-density, water-containing foam extinguishes flaming hydrocarbon liquids and then floats on the surface forming a thick insulative blanket between the fuel and oxygen. The foam blanket remains on the surface long enough for the fuel to cool below its ignition temperature. The water-soluble polymer included in such products forms a film at the interface between the flammable liquid and the aqueous foam. This film improves the ability of the aqueous foam blanket to float on the lower density hydrocarbon liquids and improves the ability of the foam to 'heal' or close-over if it is disrupted so that a continuous

blanket is maintained. Therefore, the water-soluble polymers used in fire-fighting foams are selected because they form a continuous film at the interface between hydrocarbon liquids and the aqueous foam, not because they are effective thickening agents for the aqueous foam solution. In fact, any increase in viscosity derived from a water-soluble-polymer would be undesirable because it would increase the viscosity of the foam concentrate so that it would be more difficult to pour, pump and mix with water. Thus, teachings with respect to such fire-extinguishers as addressed by Achtmann are unrelated and would be considered inapplicable to the aerially-applied retardants of Strickland, Vandersall and EP 0 911 067.

With respect to polymer particle size, the compositions of the subject claims use a water-soluble polymer (xanthan) of particle size under 100 microns that can be incorporated into a concentrated high ionic strength ammonium phosphate based fire retardant solution and stored therein for long periods of time before dilution to use concentration. During storage in the concentrated form, the small polymer particles are suspended in the high ionic strength solution as discrete particles. Then, upon dilution, the polymer hydrates and the viscosity of the resultant solution increases to provide improved aerial drop characteristics when the fire retardant solution is discharged from an aircraft flying over the target area. This is true, even when dilution occurs more than a year after preparation of the original concentrated fire retardant. Water-soluble polymers with larger weight average particle sizes were found incapable of functioning in this manner after being subjected to storage in the high ionic strength fire retardant solution for more than a short time (hours to days). None of the art of record ever recognizes or suggests this surprising advantage of the use of such small polymer particles.

According to the subject Office Action, the Frolich et al. patent and the Kuwabawa et al. patent, which are not cited in the statement of the rejection, show that small particle size increases viscosity. The Examiner also offers to submit an affidavit to support that contention. This contention may be true in some situations, but there is no indication that those situations extend beyond those in which the particulate additive does not dissolve in the media in which it is placed (e.g., clay in water). Thus, the Kuwabata et al. patent discloses the inclusion of inorganic fillers (silica, alumina, magnesium silicate, etc.) in an epoxy resin.

Indeed, the Frolich et al. patent teaches just the opposite of the contention that particle size varies inversely with viscosity. In this respect, it appears that the conclusion in the Office Action is based on a confusion between particle size and molecular weight (that is, the weight of the individual molecules in the particles). In the Frolich et al. patent, an aqueous dispersion is used for the sizing of paper products. The patent goes into great detail about the molecular weight of the sizing polymer but says little about particle size. The one instance when particle size is mentioned (Table 7, Column 13) shows that viscosity increases *directly* with the particle size. By contrast, in the subject invention, the use of a small particle size biopolymer is required to obtain the desired increase in viscosity.

The subject invention involves compositions comprising small (under 100 micron) particles of water-soluble biopolymer that can be suspended in a high ionic strength solution that, subsequently, after dilution, dissolves and thickens the diluted fire retardant composition. Larger particle sized biopolymers of the same type, have been found to be ineffective in this application.

Without having seen the statements that would be present in an affidavit to be filed by the Examiner, it is impossible to respond to the affidavit. However, it is believed that the statements would be limited in the manner set forth with respect to the Frolich et al. and Kuwabata et al. patents. Moreover, to be relevant, the affidavit not only would have to establish the inherency of the contention, but also have to establish the level of ordinary skill in the art and that the inherency of the contention would be known by the ordinarily skilled artisan.

Accordingly, the Strickland patent, the Achtmann patent, the Vandersall patent and EP 0 911 0167, whether considered individually or in combination, do not teach or suggest the combination called for in the subject claims or the surprising advantages discovered to result from that combination. Thus, it is submitted that each of the subject claims define patentably over those references.

Upon withdrawal of the rejection discussed above, the provisional patenting rejections will be the only remaining rejections. The provisional double patenting rejections are asserted in view of certain claims of co-pending applications serial nos. 09/978,602 and 09/723,567. With respect to the claims of application serial no. 09/978,602, it is noted that MPEP§804 states:

The "provisional" double patenting rejection should continue to be made by the examiner in each application as long as there are conflicting claims in more than one application unless that "provisional" double patenting rejection is the only rejection remaining in one of the applications. If the "provisional" double patenting rejection in one application is the only rejection remaining in that application, the examiner should then withdraw that rejection and permit the application to issue as a patent, thereby converting the "provisional" double patenting rejection in the other application(s) into a double patenting rejection at the time the one application issues as a patent.

If the "provisional" double patenting rejections in both applications are the only rejections remaining in those applications, the examiner should then withdraw that rejection in one of the applications (e.g., the application with the earlier filing date) and permit the application to issue as a patent. The examiner should maintain the double patenting rejection in the other application as a "provisional" double patenting rejection which will be converted into a double patenting rejection when the one application issues as a patent.

The present application was filed on the same date as was serial no. 09/978,602. However, the serial number of the subject application indicates that the subject application was entered prior to application serial no. 09/978,602. Therefore, it is requested that the subject application be considered the earlier filed for purposes of MPEP§804 and that the subject provisional double-patenting rejection be withdrawn.

With respect application serial no. 09/723,567, the claims thereof do not call for biopolymer particles under 100 microns and so the subject claims distinguish patentably over the claims of the '567 application for the reasons discussed above with respect to other cited art references that do not teach or suggest biopolymer particles of such size. The subject Office Action indicates that the provisional double-patenting rejection based on the '567 application was maintained because the instant application is the species of a genus of the '567 application. However, it is the disclosure of a species that anticipates a genus; the disclosure of a genus does not anticipate a species. Accordingly, withdrawal of the subject provisional double-patenting rejections are respectfully requested.

Appl. No. 09/978,401
Amdt. dated March 1, 2004
Reply to Office Action of October 28, 2003

Conclusion

In view of the foregoing, favorable reconsideration and early allowance of claims 1-20 are earnestly solicited.

Respectfully submitted,



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